

IN THE CLAIMS:

The following is a complete listing of claims in this application.

1. (currently amended) A device for diffusing calibrated small volumes or drops ~~(6)~~ of at least one liquid, ~~the device being of the type~~ comprising:

. at least one displacement path ~~(C, C1, C2, C3)~~ for the liquid defined by a series of pairs of close-together surfaces ~~(4a-4b, 6a-6b, ... , 14a-14b)~~ enabling constructed and arranged to enable the liquid to be retained and to be moved from one pair of surfaces to another; and

. means for applying an electric field between the pairs of surfaces in order to move the liquid from one pair of surfaces to another;

~~the device being characterized in that wherein:~~

the series of pairs of close-together surfaces ~~(4a-4b, 6a-6b, ... , 14a-14b)~~ defining at least one displacement path co-operate to store the liquid, to form drops of liquid, and to move liquid drops to an outlet from said path leading towards a drop destination site;  
and

. the means for applying an electric field ~~apply~~ applies a ~~determined~~ predetermined sequence of electric fields between the pairs of close-together surfaces so as to form drops of liquid from the liquid storage and so as to move ~~and mix~~ the drops to the drop outlet of said path.

2. (currently amended) A device according to claim 1, ~~characterized in that wherein~~ said liquid is a liquid containing an active principle intended ~~in particular~~ for applications in generating odors, in cosmetics, in medical treatments, in hygiene, in chemistry, or in medical analysis.

3. (currently amended) A device according to claim 2, ~~characterized in that~~ wherein said liquid contains at least one essential oil and/or a pheromone.

4. (currently amended) A device according to claim 1, ~~characterized in that~~ wherein the outlet for drops from the displacement path leads to the outside of the device.

5. (currently amended) A device according to claim 1, ~~characterized in that~~ wherein the outlet for drops from the displacement path leads to a destination site situated within the device.

6. (currently amended) A device according to claim 4, ~~characterized in that~~ wherein the outlet for drops is formed by at least one orifice putting the device into communication with the outside ~~(30)~~, said orifice having at least one electro-osmosis electrode or at least one heating resistance to accelerate the evaporation of liquids at ~~such points~~ the orifice.

7. (currently amended) A device according to claim 1, ~~characterized in that~~ wherein said electric field application means ~~comprise~~ comprises an electrode associated with at least one surface in each pair of close-together surfaces ~~(4a-4b, 6a-6b, ..., 14a-14b)~~.

8. (currently amended) A device according to claim 1, ~~characterized in that~~ said surfaces ~~(4a-4b, 6a-6b, ..., 14a-14b)~~ present wettability that is controlled by surface treatment.

9. (currently amended) A device according to claim 1, ~~characterized in that~~ wherein at least one of the two faces surfaces of a pair of surfaces ~~(4a-4b, 6a-6b, ..., 14a-14b)~~ is carried by a structure in the form of a mesa ~~(22a, 22b)~~ formed on ~~its~~ a respective substrate ~~(2a, 2b)~~, said mesa-forming structure causing said surfaces to be closer together than the

respective substrates, so that capillarity maintains the liquid selectively in the zones where the ~~faces~~ surfaces are closer together.

10. (currently amended) A device according to claim 1, ~~characterized in that~~ wherein the ~~two faces~~ surfaces of a pair of surfaces ~~(4a-4b, 6a-6b, ..., 14a-14b)~~ are substantially parallel.

11. (currently amended) A device according to claim 1, ~~characterized in that~~ wherein the ~~two faces~~ surfaces of a pair of surfaces form between them a small angle ~~( $\alpha$ )~~, thus creating a zone towards one edge of said ~~faces~~ (4-1, 6-1) surfaces that is closer together than an opposite zone ~~(4-2, 6-2)~~, thus enabling liquid to be entrained by capillarity towards said closer-together zone.

12. (currently amended) A device according to claim 11, ~~characterized in that~~, wherein for a pair of surfaces, said closer-together zone is situated at the edge which is closer to ~~the~~ a destination site for the displaced liquid.

13. (currently amended) A device according to claim 1, ~~characterized in that~~ wherein at least one of the pairs of close together surfaces presents a plurality of planes ~~(4a', 4a'')~~ ~~so~~ so as to create a plurality of different spacings ~~( $e_1$ ,  $e_2$ )~~ between said close-together surfaces.

14. (currently amended) A device according to claim 13, ~~characterized in that~~ wherein the ~~or each~~ at least one pair of electrodes presenting a plurality of planes ~~(4a', 4a'')~~ is arranged so that the close-together spacing is situated downstream relative to the liquid displacement direction.

15. (currently amended) A device according to claim 1, ~~characterized in that~~ at least one pair ~~wherein pairs~~ of close-together surfaces ~~(4a, 4b)~~ forms form at least one reservoir, a separation throttle pad ~~(6a, 6b)~~, and a pad ~~(8a,~~

~~8b)~~ for forming a small drop of liquid, co-operating to constitute ~~an extractor for said small volume.~~

16. (currently amended) A device according to claim 1, ~~characterized in that said wherein a pair of said close-together surfaces comprises a reservoir which defines (4a, 4b)~~ comprises a confinement volume operating by capillary action and interface tension between two close-together surfaces, at least one sector of the periphery of a liquid-retaining zone constituting extractor-forming means and at least one face surface of the retaining zone being connected to liquid feed means.

17. (currently amended) A device according to claim 16, ~~characterized in that wherein~~ the extractor-forming means is constituted by a liquid-retaining zone adjacent to a reservoir and is implemented by two close together parallel faces so as to produce capillary and surface tension action between them, said surface being provided with electrodes enabling an electric field to be created in said zone to extract calibrated quantities of liquid from the reservoir ~~(4a, 4b)~~, the width of said zone relative to the liquid displacement axis being substantially smaller than its length and more substantially smaller both than the width of the reservoir to which it is connected and that the width of the close-together surfaces of the displacement path for moving calibrated volumes of liquid to which it is connected.

18. (currently amended) A device according to claim 1, ~~characterized in that wherein~~ the displacement path ~~(10-1, 10-2, 10-3)~~ for moving calibrated volumes of liquid is constituted by a zone for retaining liquid by capillary and surface tension action between two close-together faces surfaces, such that the width of said retaining zone relative to the displacement path axis is of a dimension that is

substantially greater than that of ~~the extractor~~ an extractor-forming pair of electrodes to which it is connected, the ~~faces~~ surfaces forming said zone being provided with electrodes that enable a distributable electric field to be created for receiving at least one calibrated quantity of liquid extracted from the reservoir by the action of the extractor.

19. (currently amended) A device according to claim 1, ~~characterized in that it is made up of~~ including at least two displacement paths ~~(1a-1, 1a-2)~~ enabling calibrated quantities ~~1, 2, 3, ..., N~~ of liquids to be extracted from at least two reservoirs and conveyed towards at least one other path internal to the device, the calibrated quantities ~~1 to N~~ optionally not necessarily having the same volume.

20. (currently amended) A device according to claim 1, ~~characterized in that wherein~~ at least one reservoir ~~(4a, 4b)~~ can put into communication with the outside of the device so that liquid can be caused to penetrate therein.

21. (currently amended) A device according to claim 1, ~~characterized in that it comprises~~ including at least two reservoirs arranged in such a manner as to enable the calibrated small volumes extracted from said reservoirs to be combined and mixed together, and at least one displacement path for conveying them the combined volumes to a destination zone.

22. (currently amended) A device according to claim 1, ~~characterized in that wherein~~ the ~~or each~~ at least one reservoir and each pair of close-together surfaces of said displacement path are configured to create relaxation of the perimeter of the liquid in the absence of an electric field so as to facilitate the passage of said the liquid from one pair of surfaces to another.

23. (currently amended) A device according to claim 1,

~~characterized in that wherein~~ at least one of the ~~reservoirs~~ reservoir contains a rinsing liquid suitable for cleaning the at least one displacement path ~~(s)~~ path for moving calibrated small volumes of liquid.

24. (currently amended) A device according to claim 1, ~~characterized in that it is constructed and~~ arranged to be fed from at least one extractable reservoir ~~(42)~~, said reservoir being in the form of a cartridge or the like, for example.

25. (currently amended) An assembly for diffusing liquid in the form of small volumes, ~~the assembly being characterized in that it integrates comprising~~ in a common package:

- at least one device ~~(1)~~ for forming, moving, and diffusing drops according to claim 1;
- control electronics for generating electrical potentials ~~(39, 46)~~ for delivering control signals in programmable manner to the means for applying an electric field;
- at least one reservoir ~~(4a, 4b)~~ of liquid to be diffused; and
- an electrical power supply source ~~(38)~~, e.g., constituted by an optionally rechargeable battery.

26. (currently amended) An assembly according to claim 25, ~~characterized in that wherein~~ the package is substantially plane planar, having the format of a smart card or credit card.

LAW OFFICES  
DENNISON, SCHULTZ, DOUGHERTY & MACDONALD  
SUITE 105  
1727 KING STREET  
ALEXANDRIA, VIRGINIA 22314-2700  
703 837-9600